

**PROPOSED AMENDMENTS TO  
APPLIANCE EFFICIENCY REGULATIONS  
(EXPRESS TERMS)**

**CALIFORNIA CODE OF REGULATIONS  
TITLE 20, SECTIONS 1601 THROUGH 1608**

**2008 APPLIANCE EFFICIENCY RULEMAKING,  
PHASE I, PART A  
DOCKET NUMBER 08-AAER-1A**

**15-DAY LANGUAGE**

**DRAFT REGULATIONS**

NOVEMBER 2008  
CEC-400-2008-020-15DAY



Arnold Schwarzenegger, Governor



# CALIFORNIA ENERGY COMMISSION

Betty Chrisman  
Harinder Singh  
Gary Flamm  
William Staak  
***Principal Authors***

Melinda Merritt  
***Project Manager***

G. William Pennington  
***Manager***  
**BUILDINGS AND  
APPLIANCES OFFICE**

Valerie T. Hall  
***Deputy Director***  
**EFFICIENCY AND  
RENEWABLE ENERGY  
DIVISION**

Melissa Jones  
***Executive Director***

## DISCLAIMER

This report was prepared by a California Energy Commission staff person. It does not necessarily represent the views of the Energy Commission, its employees, or the State of California. The Energy Commission, the State of California, its employees, contractors and subcontractors make no warrant, express or implied, and assume no legal liability for the information in this report; nor does any party represent that the uses of this information will not infringe upon privately owned rights. This report has not been approved or disapproved by the California Energy Commission nor has the California Energy Commission passed upon the accuracy or adequacy of the information in this report.



## Abstract

The current Appliance Efficiency Regulations, (California Code of Regulations, Title 20, Sections 1601 through 1608), dated December 2007, contain amendments that were adopted by the California Energy Commission on October 10, 2007, and replaced all previous versions. These Proposed Amendments to Appliance Efficiency Regulations (Express Terms) reflect both 45-Day Language, published on August 29, 2008, and further modified 15-Day Language, published on November 14, 2008, proposed for adoption by the California Energy Commission.

The Appliance Efficiency Regulations include standards for both federally-regulated appliances and non-federally-regulated appliances. Twenty-one categories of appliances are included in the scope of these regulations. The standards within these regulations apply to appliances that are sold or offered for sale in California, except those sold wholesale in California for final retail sale outside the state and those designed and sold exclusively for use in recreational vehicles or other mobile equipment.

**Keywords:** Appliance Efficiency Regulations, appliance standards, compact fluorescent lamp, CFL, lamp ballasts, lamp sockets, general service incandescent lamps, general purpose lighting, emergency lighting, light emitting diode, LED, luminaires, portable luminaires, under-cabinet luminaires,

~~Struck-out~~ text indicates proposed deletions of existing language in the 45-day language.

~~Double struck-out~~ text indicates proposed deletions of existing language in the 15-day language.

Text with underline indicates proposed new language in the 45-day language.

Text with double underline indicates additional proposed new language in the 15-day language.



## Section 1601 Scope

...

(k) Lamps, which are federally-regulated general service fluorescent lamps, federally-regulated incandescent reflector lamps, ~~and state-regulated general service incandescent lamps,~~ general service lamps, and includes GU-24 base lamps.

...

(n) Luminaires, which are torchieres, metal halide luminaires, portable luminaires, ~~and under-cabinet luminaires,~~ and includes luminaires with GU-24 socket and base configurations and GU-24 adaptors.

...

NOTE: Authority cited: Sections 25213, 25218(e), 25402(a)-(c), and 25960, Public Resources Code.

Reference: Sections 25216.5(d), 25402(a)-(c), and 25960, Public Resources Code.

## Section 1602. Definitions.

### (a) General.

In this Article the following definitions apply. If a term is not defined here, the applicable definition in NAECA, EPAAct, EISA, or the test methods listed in Section 1604 shall apply where it is reasonable to do so.

...

“Color rendering index (CRI)” means the measured degree of color shift objects undergo when illuminated by a light source as compared with the color of those same objects when illuminated by a reference source of comparable color temperature, as determined using the applicable test method in Section 1604(k).

...

“EISA” means the Energy Independence and Security Act of 2007.

...

“Light emitting diode (LED)” means a p-n junction solid state device, the radiated output of which is a function of the physical construction, material used, and exciting current of the device. The output of a light-emitting diode may be in:

- (1) the infrared region;
- (2) the visible region; or
- (3) the ultraviolet region.

...

“LPW” (lumens per watt) means “average lamp efficacy (LPW)” as defined in Section 1602(k) of this Article.

...

~~“Lumen” means a measure of the luminous flux or quantity of light emitted by a source.~~

...

“OSA” means the Optical Society of America.

...

### **(k) Lamps.**

“Appliance Lamp” means any lamp specifically designed to operate in a household appliance. Examples of appliance lamps include oven lamps, refrigerator lamps, and vacuum cleaner lamps. Appliance lamps shall be designated and marketed for the intended application. The designation shall be on the lamp packaging, and marketing materials shall identify the lamp as being an appliance lamp, has a maximum wattage of 40 watts, and is sold at retail, including an oven lamp, refrigerator lamp, and vacuum cleaner lamp; and is designated and marketed for the intended application, with:

- (1) the designation on the lamp packaging; and
- (2) marketing materials that identify the lamp as being for appliance use.

...

“Average rated life” means the length of time declared by the manufacturer at which 50 percent of any large number of units of a lamp reaches the end of their individual lives.

...

“Colored fluorescent lamp” means a fluorescent lamp designated and marketed as a colored lamp, and with either of the following characteristics: a CRI less than 40, as determined according to the method given in CIE publication 13.3 1995, or a lamp correlated color temperature less than 2,500K or greater than 6,600K.

“Colored incandescent lamp” means an incandescent lamp designated and marketed as a colored lamp that has:

- (1) a CRI of less than 50, as determined according to the test method given in CIE publication 13.3-1995; or
- (2) has a correlated color temperature less than 2,500K, or greater than 4,600K, where correlated color temperature is defined as the absolute temperature of a blackbody whose chromaticity nearly resembles that of the light source. The designation shall be on the lamp packaging, and marketing materials shall identify the lamp as being a colored lamp computed according to the Journal of Optical Society of America, Vol. 58, pages 1528-1595 (1986).



“Design voltage” with respect to an incandescent lamp means:

- (1) the voltage marked as the intended operating voltage;
- (2) the mid-point of the voltage range if the lamp is marked with a voltage range; or
- (3) 120 V if the lamp is not marked with a voltage or voltage range.

“Enhanced Spectrum” or “Modified Spectrum” lamp, as related to incandescent lamps, means an incandescent lamp that is not a colored incandescent lamp, and, when operated at its rated voltage and wattage:

- (1) Has a color point (x,y) chromaticity coordinates on the Commission Internationale de l'Eclairage (C.I.E.) 1931 chromaticity diagram that lies below the black-body locus, and
- (2) Has a color point (x,y) chromaticity coordinates on the C.I.E. 1931 chromaticity diagram that lies at least 4 MacAdam steps distant from the color point of a clear lamp with the same filament and bulb shape, operated at the same rated voltage and wattage. The MacAdam steps are defined as referenced in Illuminating Engineering Society of North America LM-16-1993/1999.

The designation shall be on the lamp packaging, and marketing materials shall identify the lamp as being “enhanced spectrum,” “modified spectrum,” or a similar designation

...

“Federally-regulated general service incandescent lamp” means a standard incandescent or halogen-type lamp that:

- (1) is intended for general service applications;
- (2) has a medium screw base
- (3) has a lumen range of not less than 310 lumens and not more than 2,600 lumens; and
- (4) is capable of being operated at a voltage range at least partially within 110 and 130 volts.

but does not include the following incandescent lamps:

- (A) An appliance lamp.
- (B) A black light lamp.
- (C) A bug lamp.
- (D) A colored lamp.
- (E) An infrared lamp.
- (F) A left-hand thread lamp.
- (G) A marine lamp.
- (H) A marine signal service lamp.
- (I) A mine service lamp.
- (J) A plant light lamp.
- (K) A reflector lamp.
- (L) A rough service lamp.

- (M) A shatter-resistant lamp (including a shatter-proof lamp and a shatter protected lamp).
- (N) A sign service lamp.
- (O) A silver bowl lamp.
- (P) A showcase lamp.
- (Q) A 3-way incandescent lamp.
- (R) A traffic signal lamp.
- (S) A vibration service lamp.
- (T) A G shape lamp (as defined in ANSI C78.20-2003 and C79.1-2002) with a diameter of five inches or more.
- (U) A T shape lamp (as defined in ANSI C78.20-2003 and C79.1-2002) and that uses not more than 40 watts or has a length of more than 10 inches.
- (V) A B, BA, CA, F, G16, G-25, G30, S, or M-14 lamp (as defined in ANSI C79.1-2002 and ANSI C78.20-2003) of 40 watts or less.

“Federally-regulated general service lamp” includes:

- (1) general service incandescent lamps;
- (2) compact fluorescent lamps;
- (3) general service light-emitting diode (LED or OLED) lamps; and
- (4) any other lamps that the Secretary determines are used to satisfy lighting applications traditionally served by general service incandescent lamps;

but does not include any:

- (A) lighting application or bulb shape excluded from the definition of “federally regulated general service incandescent lamp;” or;
- (B) general service fluorescent lamp or incandescent reflector lamp.

...

“Initial performance values” means the photometric and electrical characteristics of the lamp at the end of 100 hours of operation.

...

“Lamp Efficacy (LE)” means the measured lumen output of a lamp in lumens divided by the measured lamp electrical power in watts expressed in units of lumens per watt (LPW).

...

“Lumen maintenance” means the luminous flux or lumen output at a given time in the life of the lamp and expressed as a percentage of the rated luminous flux or rated lumen output, respectively.

...

“Medium base compact fluorescent lamp” means an integrally ballasted fluorescent lamp with a medium screw base, a rated input voltage range of 115 to 130 volts, and which is

designed as a direct replacement for a general service incandescent lamp; however the term does not include:

(1) any lamp that is:

(A) specifically designed to be used for special purpose applications; and

(B) unlikely to be used in general purpose applications, such as the applications described in the definition of “Federally-regulated general service incandescent lamp” in this section; or

(2) any lamp not described in the definition of “Federally-regulated general service incandescent lamp” in this section that is excluded by the Secretary, by rule, because the lamp is:

(A) designed for special applications; and

(B) unlikely to be used in general purpose applications.

“Medium screw base” means an Edison screw base identified with the prefix E-26 in the American National Standard for Electric Lamp Bases, ANSI IEC C81.61-2003.

...

“Organic light-emitting diode (OLED)” means a thin-film light-emitting device that typically consists of a series of organic layers between two electrical contacts (electrodes).

...

“Rated luminous flux” or “rated lumen output” means the initial lumen rating (100 hour) declared by the manufacturer, which consists of the lumen rating of a lamp at the end of 100 hours of operation.

“Rated supply frequency” means the frequency marked on the lamp.

“Rated voltage” means the voltage marked on the lamp. With respect to incandescent lamps, rated voltage means:

(1) the design voltage if the design voltage is 115V, 130V, or between 115V and 130V;

(2) 115V if the design voltage is less than 115V and greater than or equal to 100V and the lamp can operate at 115V; and

(3) 130V if the design voltage is greater than 130V and less than or equal to 150V and the lamp can operate at 130V.

“Rated wattage” means ~~a lamp’s the wattage value as stated by the manufacturer on the lamp, the lamp’s packaging, or the lamp’s marketing materials.~~ marked on the lamp. With respect to 4-foot medium bi-pin T8, T10, or T12 lamps, rated wattage means if the lamp is:

(1) listed in ANSI C78.1-1991, the nominal wattage of a lamp determined by the lamp designation in Annex A.2 of ANSI C78.1-1991; or

- (2) a residential straight-shaped lamp, the wattage a lamp consumes when operated on a reference ballast for which the lamp is designed; or
- (3) neither listed in ANSI C78.1-1991 nor a residential straight-shaped lamp, the wattage a lamp consumes when using reference ballast characteristics of 236 volts, 0.43 amps and 439 ohms for T10 or T12 lamps, or reference ballast characteristics of 300 volts, 0.265 amps, and 910 ohms for T8 lamps.

. . .

“Residential straight-shaped lamp” means a low pressure mercury electric-discharge source in which a fluorescing coating transforms some of the ultraviolet energy generated by the mercury discharge into light, including a straight-shaped fluorescent lamp with medium bi-pin bases of nominal overall length of 48 inches, and is either designed exclusively for residential applications; or designed primarily and marketed exclusively for residential applications.

- (1) A lamp is designed exclusively for residential applications if it will not function for more than 100 hours with a commercial high-power-factor ballast.
- (2) A lamp is designed primarily and marketed exclusively for residential applications if it:
  - (A) is permanently and clearly marked as being for residential use only;
  - (B) has a life of 6,000 hours or less when used with a commercial high-power-factor ballast;
  - (C) is not labeled or represented as a replacement for a fluorescent lamp that is a covered product; and
  - (D) is marketed and distributed in a manner designed to minimize use of the lamp with commercial high-power-factor ballasts.
- (3) A manufacturer may market and distribute a lamp in a manner designed to minimize use of the lamp with commercial high-power factor ballasts by:
  - (A) packaging and labeling the lamp in a manner that clearly indicates the lamp is for residential use only and includes appropriate instructions concerning proper and improper use; if the lamp is included in a catalog or price list that also includes commercial/industrial lamps, listing the lamp in a separate residential section accompanied by notes about proper use on the same page; and providing as part of any express warranty accompanying the lamp that improper use voids such warranty; or
  - (B) using other comparably effective measures to minimize use with commercial high-power factor ballasts.

“Rough service lamp” means a lamp that

- (1) has a minimum of 5 supports with filament configurations that are C-7A, C-11, C-17, and C-22 as listed in Figure 6-12 of the 9th edition of the IESNA Lighting handbook, or similar configurations where lead wires are not counted as supports; and
- (2) is designated and marketed specifically for “rough service” applications, with:
  - (A) The designation shall appear on the lamp packaging; and
  - (B) marketing materials shall that identify the lamp as being for rough service.

“Self-ballasted compact fluorescent lamp” means a compact fluorescent lamp unit that incorporates, permanently enclosed, all elements that are necessary for the starting and stable operation of the lamp, and does not include any replaceable or interchangeable parts.

“Shatter-resistant lamp, shatter-proof lamp, or shatter-protected lamp” means a lamp with an external coating on the bulb wall to resist breakage. The designation shall be on the lamp packaging, and marketing materials shall identify the lamp as being a shatter resistant lamp that:

- (1) has a coating or equivalent technology that is compliant with the NSF/ANSI 51 and is designed to contain the glass if the glass envelope of the lamp is broken; and
- (2) is designated and marketed for the intended application, with:
  - (A) the designation on the lamp packaging; and
  - (B) marketing material that identify the lamp as being shatter-resistant, shatterproof, or shatter-protected.

...

“Vibration service lamp” or “Vibration resistant lamp” means a lamp with that:

- (1) has filament configurations similar to but not limited to that are C-5, C-7A, or C-9, as listed in Figure 6-12 of the 9th Edition of the IESNA Lighting Handbook or similar configurations;-
- (2) has a maximum wattage of 60 watts;
- (3) is sold at retail in packages of two lamps or less; and
- (4) The lamp is designated and marketed specifically for vibration service or vibration-resistant applications, with:
  - (A) The designation shall be appearing on the lamp packaging; and
  - (B) marketing materials shall that identify the lamp as being vibration resistant or vibration service only.

“Voltage range” means a band of operating voltages as marked on an incandescent lamp, indicating that the lamp is designed to operate at any voltage within the band.

...

## **(n) Luminaires.**

...

“Art Work Luminaire” means a luminaire designed only to be mounted directly to art work only for the purpose of illuminating that art work.

“Color Correlated Temperature (CCT)” means the color appearance, or actual color of the lamp in accordance with IESNA LM-16-1999.

“Compact Fluorescent Lamp” means a fluorescent lamp typically designed to replace general service incandescent lamps, but may include sizes that replace conventional linear fluorescent lamps in smaller luminaires, and are typically less than 24 inches in length. The definition for “Fluorescent lamp” is defined in Section 1602(k) of this Article.

“Dedicated fluorescent lamp socket” means one of the ANSI designated type of fluorescent lamp sockets that will accept only a compact or linear fluorescent lamp, and that is used in luminaires where the ballast is permanently installed in the luminaire between the power cord and the lamp socket. “Dedicated fluorescent lamp socket” does not include sockets where the ballast is located between the socket and the lamp, or where the ballast is integrated into the lamp.

“E12 screw-based socket” means an ANSI designation for a screw-base socket commonly referred to as a candelabra screw-base.

“E17 screw-based socket” means an ANSI designation for a screw-base socket commonly referred to as an intermediate screw-base.

“E26 screw-based socket” means an ANSI designation for a screw-base socket commonly referred to as a medium screw-base.

“GU-24” means the designation of a lamp holder and socket configuration, based on a coding system by the International Energy Consortium; where “G” indicates the broad type of two or more projecting contacts, such as pins or posts; “U” distinguishes between lamp and holder designs of similar type but that are not interchangeable due to electrical or mechanical requirements; and “24” indicates 24 millimeters center to center spacing of the electrical contact posts.”

“GU-24 Adaptor” means a one-piece device, pig-tail, wiring harness, or other such socket/base attachment that connects to a GU-24 socket on one end and provides a different type of socket or connection on the other end; a GU-24 adaptor does not alter the voltage. A fluorescent ballast with a GU-24 base is not a GU-24 adaptor.

...

“High Frequency Electronic Ballast” means a fluorescent lamp ballast as defined in Section 1602(j), and having an output frequency of no less than 20kHz. “Fluorescent lamp ballast” is defined in Section 1602(j) of this Article.

...

“LED Light Engine” or “LED Light Engine with Integral Heat Sink” (also known as an LED Light Source System) means a subsystem of an LED luminaire that includes one or more LED components, including an LED driver (Ppower Ssource), electrical and mechanical interfaces, and an integral heat sink to provide thermal dissipation. An LED source system may be designed to accept additional components that provide aesthetic, optical, and environmental control (other than thermal dissipation).

“LED Luminaire” means a complete LED lighting unit consisting of an LED light source, meaning one or more LED lamps or LED light engines, and driver together with parts to distribute light, to position and protect the light source, and to connect the light source to the electrical power.

...

“Luminaire Efficacy” for LEDs means the luminous efficacy of the LED luminaire, or of the LED light engine with integral heat sink, when tested in accordance with IESNA LM-79-08.

...

“Portable Floor Luminaires” means a portable luminaires designed to be located on the floor and not located on a table, desk, or other structure above the floor, and which are a minimum of 48 inches tall.

“Portable Luminaires” means a luminaires with that has a flexible cord and an attachment plug for connection to a nominal 120-volt, 15- or 20-ampere branch circuit, that allowing the user to relocate the luminaire without any rewiring; that are typically controlled with a switch located on the luminaire itself or on the power cord; and, that are intended for use in accordance with the National Electrical Code, ANSI/NFPA 70-2002. Portable luminaires does not include direct plug-in nightlights, sun and heat lamps, aquarium lamps, medical and dental lights, portable electric hand lamps, signs and commercial advertising displays, photographic lamps, germicidal lamps, or portable luminaires for marine use or for use in hazardous locations as defined in the National Electrical Code, ANSI/NFPA 70. Portable luminaires also does not include Christmas tree and decorative lighting outfits, or electric candles and candelabras without lamp shades, which that are covered by the Standard for Christmas Tree and Decorative Outfits, UL 588.

“Portable Table Luminaires” means a portable luminaires designed to be located on a table, desk, or other structure above the floor, regardless of the height of the luminaire.

...

“System Input Power Rating” means the operating input wattage of the rated lamp/ballast combination published in manufacturer’s catalogs based on independent testing lab reports as specified by “Standards for Luminaire” UL 1598.

...

“Wall Mount Adjustable Luminaire” means a portable luminaire that is designed only to be mounted on a wall, having no base which will allow the luminaire to stand on a horizontal surface.

The following standards are incorporated by reference in Section 1602.

...

#### **ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA (IESNA)**

<u>IESNA LM-16-1993</u>	<u>IES Practical Guide to Colorimetry of Light Sources</u>
<u>IESNA LM-79-08</u>	<u>Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products</u>

...

#### **INTERNATIONAL COMMISSION ON ILLUMINATION (CIE)**

<u>CIE Publication 13.3 1995</u>	<u>Method of Measuring and Specifying Colour Rendering Properties of Light Sources</u>
----------------------------------	--

<u>Copies available from:</u>	<u>International Commission on Illumination</u> <u>CIE Central Bureau</u> <u>Kegelgasse 27</u> <u>A-1030 Vienna</u> <u>AUSTRIA</u> <u>Phone: +43 1 714 31 87 0</u> <u>FAX: +43 1 714 31 87 18</u> <u>e-mail: <a href="mailto:ciecb@cie.co.at">ciecb@cie.co.at</a></u>
-------------------------------	--

...

#### **OPTICAL SOCIETY OF AMERICA (OSA)**

Journal of Optical Society of America, Volume 58 (1986)



Copies available from: Optical Society of America  
2010 Massachusetts Ave., N.W.  
Washington, D.C. 20036-1012 USA  
[www.osa.org](http://www.osa.org)  
Phone: 202.223.8130  
FAX: 202.223.1096

...

### **UNDERWRITERS LABS (UL)**

UL 588 Standard for Seasonal and Holiday Decorative Products

UL 1598 Standards for Luminaires

Copies available from: Underwriters Laboratories, Inc.  
333 Pfingsten Road  
Northbrook, IL 60062-2096  
[www.ul.com](http://www.ul.com)  
Phone: (847) 272-8800  
FAX: (847) 272-8129

NOTE: Authority cited: Sections 25213, 25218(e), 25402(a)-(c), and 25960, Public Resources Code.

Reference: Sections 25216.5(d), 25402(a)-(c), and 25960, Public Resources Code.

...

### **Section 1604. Test Method for Specific Appliances**

...

#### **(k) Lamps.**

(1) The test method for federally-regulated general service fluorescent lamps, ~~state regulated general service incandescent lamps, state-regulated incandescent reflector lamps,~~ and federally-regulated incandescent reflector lamps is 10 CFR Section 430.23(r) (Appendix R to Subpart B of Part 430) (20052008).

(2) The test method for state-regulated general service incandescent lamps and state regulated incandescent reflector lamps is 10 CFR Section 430.23(r) (Appendix R to Subpart B of Part 430) (2008).

(3) The test method for medium base compact fluorescent lamps is 10 CFR Section 430.23(v) (Appendix W to Subpart B of Part 430) (2008).

...

**(n) Luminaires.**

(4) The test methods for LED luminaires using LED lamps and light engines are California Joint Appendix JA8 – 2008, “Testing of Light Emitting Diode Light Sources,” or IES LM-79-08, “Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products,” at manufacturer’s option.

...

The following documents are incorporated by reference in Section 1604.

**CALIFORNIA ENERGY COMMISSION TEST METHODS**

California Joint Appendix  
JA8 – 2008

Testing of Light Emitting Diode Light Sources

...

Copies available from:

California Energy Commission  
Energy Hotline  
1516 Ninth Street, MS-25  
Sacramento, California 95814  
Phone: (916) 654-5106  
FAX: (916) 654-4304

...

**ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA (IESNA)**

IESNA LM-79-08

Approved Method: Electrical and Photometric  
Measurements of Solid-State Lighting Products

Copies available from:

Illuminating Engineering Society of North America  
120 Wall Street, 17<sup>th</sup> Floor  
New York, NY 10005-4001  
[www.iesna.org](http://www.iesna.org)  
Phone: (212) 248-5000  
FAX: (212) 248-5017/18

...

NOTE: Authority cited: Sections 25213, 25218(e), 25402(a)-(c), and 25960, Public Resources Code.

Reference: Sections 25216.5(d), 25402(a)-(c), and 25960, Public Resources Code.

...

**Section 1605.3. State Standards for Non-Federally-Regulated Appliances.**

...

**(k) Lamps**

...

**(3)(4) Standards for State-Regulated General Service Incandescent Lamps, General Service Lamps, and Modified Spectrum Incandescent Lamps.** The energy consumption rate of ~~State-regulated general service incandescent lamps, general service lamps, and modified spectrum general service incandescent lamps~~ manufactured on or after the effective dates shown in Tables K-9, ~~and~~ K-10, and K-11 shall meet the standards shown in Tables K-9, ~~and~~ K-10, and K-11.

**Table K-9: Standards for State-regulated General Service Incandescent Lamps - Tier I**

<b><u>Rated Lumens Range</u></b>	<b><u>Maximum rated Wattage</u></b>	<b><u>Minimum Rated Life Time</u></b>	<b><u>Proposed California Effective Date</u></b>
<u>1490-2600 Lumens</u>	<u>72 watts</u>	<u>1,000 Hours</u>	<u>Jan, 1, 2011</u>
<u>1050-1489 Lumens</u>	<u>53 watts</u>	<u>1,000 Hours</u>	<u>Jan 1, 2012</u>
<u>750-1049 Lumens</u>	<u>43 watts</u>	<u>1,000 Hours</u>	<u>Jan 1, 2013</u>
<u>310-749 Lumens</u>	<u>29 watts</u>	<u>1,000 Hours</u>	<u>Jan 1, 2013</u>

**Table K-10: Standards for State-regulated General Service Lamps -Tier II**

<b><u>Lumens Range</u></b>	<b><u>Maximum Minimum Lamp Efficacy</u></b>	<b><u>Minimum Rated Life Time</u></b>	<b><u>Proposed California Effective Date</u></b>
<u>All</u>	<u>45 lumens per watt</u>	<u>1,000 Hours</u>	<u>Jan, 1, 2018</u>

- (A) These standards apply to each lamp that:**
- 1. is intended for a general service or general illumination application (whether incandescent or not);**
  - 2. has a medium screw base or any screw base not defined in ANSI C81.61-2006;**
  - 3. is capable of being operated at a voltage at least partially within the range of 110 to 130 volts; and**

4. \_\_\_\_\_ is manufactured or imported after December 31, 2010.

(B) Each lamp described in Section 1605.3(k)(4)(A) shall have a color rendering index that is greater than or equal to:

1. \_\_\_\_\_ 80 for nonmodified spectrum lamps; or

2. \_\_\_\_\_ 75 for modified spectrum lamps.

**Table K-11: Standards for State-regulated Modified Spectrum General Service  
Incandescent Lamps -Tier I**

<b><u>Rated Lumens Range</u></b>	<b><u>Minimum rated Wattage</u></b>	<b><u>Minimum Rated Life Time</u></b>	<b><u>Proposed California Effective Date</u></b>
<u>1118-1950 Lumens</u>	<u>72 watts</u>	<u>1,000 Hours</u>	<u>Jan. 1, 2011</u>
<u>788-1117 Lumens</u>	<u>53 watts</u>	<u>1,000 Hours</u>	<u>Jan 1, 2012</u>
<u>563-787 Lumens</u>	<u>43 watts</u>	<u>1,000 Hours</u>	<u>Jan 1, 2013</u>
<u>232-562 Lumens</u>	<u>29 watts</u>	<u>1,000 Hours</u>	<u>Jan 1, 2013</u>

...

**(6) GU-24 Base Lamps.**

GU-24 base lamps shall not be incandescent lamps.

...

**(n) Luminaires.**

- (3) **Energy Efficiency Standards for Under-Cabinet Luminaires.** Under-cabinet luminaires that are equipped with T-8 fluorescent lamps and that are designed to be attached to office furniture and that are manufactured on or after January 1, 2006 shall be equipped with ballasts that have a ballast efficacy factor not less than the applicable values shown in Table N-2.

Under-cabinet luminaires that are equipped with GU-24 sockets manufactured on or after January 1, 2010 shall not be rated for use with incandescent lamps of any type, including line voltage or low voltage.

**EXCEPTIONS:**

1. Luminaires equipped with T-8 ballasts designed for dimming.
2. Luminaires that are:

(a) specifically and exclusively designed for use in applications where electromagnetic interference from electronic ballasts would interfere with critical, sensitive instrumentation and equipment such as medical imaging devices; and

(b) clearly, legibly, and permanently labeled, in at least 12 point type and in a place likely to be seen by the purchaser and the installer, "This 'luminaire' or 'fixture' is intended exclusively for use in applications where critical, sensitive

equipment would be adversely affected by electronic lamp ballast electromagnetic radiation”.

...

**(4) Portable Luminaires.**

- (A) Portable luminaires manufactured on or after January 1, 2010 shall meet one or more of the following requirements:
1. Be equipped with a dedicated fluorescent lamp socket connected to a high frequency electronic ballast contained within the portable luminaire with minimum system efficacy requirements shown in Table N-3;

**Table N-3**  
**Minimum System Efficiency Requirements for Pin-Based Fluorescent Lamps for Portable Luminaires**

<b><u>System Input Power Rating</u></b>	<b><u>Minimum System Efficacy</u></b>
<u>≤ 5 watts</u>	<u>30 lumens per watt</u>
<u>&gt; 5 watts to ≤ 15 watts</u>	<u>40 lumens per watt</u>
<u>&gt; 15 watts to ≤ 40 watts</u>	<u>50 lumens per watt</u>
<u>&gt; 40 watts</u>	<u>60 lumens per watt</u>

2. Be equipped with a one or more GU-24 line-voltage sockets and not rated for use with incandescent lamps of any type, including line voltage or low voltage;
3. Be an light emitting diode (LED) luminaire, or a portable luminaire with an LED light engine with integral heat sink, that complies with the minimum requirements shown in Table N-4;

**Table N-4**  
**Minimum Requirements for Portable LED Luminaires, and Portable Luminaires**  
**with LED Light Engines with Integral Heat Sink**

<b><u>Criteria</u></b>	<b><u>Requirement</u></b>
<b><u>Minimum Light Output</u></b>	<b><u>≥ 200 lumens (initial)</u></b>
<b><u>Testing Requirements</u></b>	<b><u>Input wattage, luminous flux, and system efficacy shall be tested in accordance with California Joint Appendix JA8-2008, "Testing of Light Emitting Diode Light Sources," or in accordance with IES LM-79-08, "Approved Method: Electrical and Photometric Measurements of Solid State Lighting Products."</u></b>
<b><u>Minimum LED Luminaire Efficacy</u></b>	<b><u>If testing an LED luminaire</u></b> <b><u>29 lumens/W</u></b>
<b><u>Minimum LED Light Engine Efficacy</u></b>	<b><u>If testing an LED light engine with integral heat sink</u></b> <b><u>40 lumens/W</u></b>
<b><u>Allowable Color Correlated Temperature (CCT)</u></b>	<b><u>2700 K through 5000 K</u></b>
<b><u>Minimum Color Rendering Index (CRI)</u></b>	<b><u>75</u></b>
<b><u>Power Factor (for luminaires labeled or sold for residential use)</u></b>	<b><u>Residential ≥ 0.70</u></b>
<b><u>Electromagnetic and Radio Frequency Interference</u></b>	<b><u>• Power supplies designated by the manufacturer for residential applications must meet FCC requirements for consumer use (FCC 47 CFR Part 15/18 Consumer Emission Limits).</u></b> <b><u>• Power supplies designated by the manufacturer for commercial applications must meet FCC requirements for non-consumer use (FCC 47 CFR Part 15/18 Non-consumer Emission Limits).</u></b>
<b><u>Noise</u></b>	<b><u>Power supply shall have a Class A sound rating.</u></b>
<b><u>Transient Protection</u></b>	<b><u>Power supply shall comply with IEEE C.62.41-1991, Class A operation. The line transient shall consist of seven strikes of a 100 kHz ring wave, 2.5 kV level, for both common mode and differential mode.</u></b>

4. ~~If~~ Be equipped with an E12, E17, or E26 screw-based socket, ~~the luminaire shall and be prepackaged and sold together with one screw-based compact fluorescent lamp, or with one screw-based LED lamp for each screw-based socket on the portable luminaire. The compact fluorescent or LED lamps which are prepackaged with the portable luminaire shall be fully compatible with the luminaire controls, including meaning that portable luminaires having a dimmer control shall be~~

prepackaged with dimmable compact fluorescent or LED lamps, and portable luminaires having 3-way controls shall be prepackaged with 3-way compact fluorescent or LED lamps. The compact fluorescent lamps required to be which are prepackaged with the luminaires shall also meet the minimum energy efficiency levels established for 2008 by Energy Star for compact fluorescent lamps in effect on December 31, 2008. The LED lamps required to be packaged with the luminaire shall comply with the minimum requirements shown in Table N-4;

5. Be equipped with one or more single-ended, non-screw based halogen lamp sockets (line or low voltage), a dimmer control or high low control, and be rated for a maximum of 100W.

EXCEPTIONS to Section 1605.3(n)(4). The following portable luminaires are not required to be prepackaged and sold together with compact fluorescent or LED lamps:

~~EXCEPTION 1~~ to Section 1605.3(n)(4). Portable Wall Mount Adjustable Luminaires that meet all of the following requirements: Designed only to be mounted on a wall, having no base which will allow the luminaire to stand on a horizontal surface, having an articulated arm, having a maximum overall length of 24 inches in any direction, fitted only with a single E-12, E-17 or E-26 lamp socket per luminaire, and controlled with an integral dimmer. Luminaires manufactured on or before December 31, 2011 shall have a maximum relamping rated wattage of 57 watts, and luminaires manufactured on or after January 1, 2012 shall have a maximum relamping rated wattage of 43 watts, as listed on a permanent pre-printed factory-installed label in accordance with Underwriters Laboratories (UL) 153.

~~EXCEPTION 2~~ to Section 1605.3(n)(4). Art Work Luminaires that meet all of the following requirements: Designed only to be mounted directly to art work only for the purpose of illuminating that art work, fitted only with E-12 screw-base line-voltage sockets, having no more than three sockets per luminaire, and controlled with an integral high/low switch. Luminaires with a single socket shall have a maximum relamping rated wattage of 25 watts, and luminaires with two or three sockets shall have a maximum relamping rated wattage of 15 watts per socket, as listed on a permanent pre-printed factory-installed label in accordance with Underwriters Laboratories (UL) 153.

- ~~6. If equipped with single-ended, non-screw based halogen lamp sockets (line or low voltage), must include a dimmer control or high low control and be rated for a maximum of 100W.~~
- (B) Portable luminaires that have internal power supplies shall have zero standby power when the luminaire is turned off.



~~(C) Beginning January 1, 2013, portable luminaire manufacturers selling products in California shall submit to the Energy Commission annual unit sales of portable non-screw based halogen luminaires sold in California, by major product class. Data for each calendar year shall be submitted no later than May 1 of the following year.~~

**(5) GU-24 luminaires, sockets, and adaptors.**

~~(A) Permanently installed and portable luminaires with GU-24 sockets manufactured on or after January 1, 2010 shall not be rated for use with incandescent lamps of any type, including line voltage or low voltage.~~

~~(B) GU-24 adaptors manufactured on or after January 1, 2010 shall not adapt a GU-24 socket to any other line voltage socket.~~

...

The following standards are incorporated by reference in Section 1605.3.

**CALIFORNIA ENERGY COMMISSION TEST METHODS**

~~California Joint Appendix JA8—2008—Testing of Light Emitting Diode Light Sources~~

~~Copies available from: California Energy Commission  
Energy Hotline  
1516 Ninth Street, MS-25  
Sacramento, California 95814  
Phone: (916) 654-5106  
FAX: (916) 654-4304~~

**FEDERAL REQUIREMENTS**

Energy Star Program Requirements for CFLs

Copies available from: US EPA  
Climate Protection Partnership  
ENERGY STAR Programs Hotline & Distribution  
(MS-6202J)  
1200 Pennsylvania Ave NW  
Washington, DC 20460  
[www.energystar.gov](http://www.energystar.gov)

47 CFR Part 15/18

Federal Communications Commission: Non- consumer  
Emission Limits

Copies available from: Superintendent of Documents  
U.S. Government Printing Office  
Washington, DC 20402  
[www.access.gpo.gov/nara/cfr](http://www.access.gpo.gov/nara/cfr)

## **INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)**

IEEE C.62.41-1991                      Recommended Practices on Surge Voltages in Low-voltage AC Power Circuits

Copies available from:              Institute of Electrical and Electronics Engineers  
Publications Office  
10662 Los Vaqueros Circle  
PO Box 3014  
Los Alamitos, CA 90720-1264  
[www.ieee.org](http://www.ieee.org)  
Phone: (714) 821-8380  
Fax: (714) 821-4010

## **ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA (IESNA)**

IESNA LM-79-08                      Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Copies available from:              Illuminating Engineering Society of North America  
120 Wall Street, 17<sup>th</sup> Floor  
New York, NY 10005-4001  
[www.iesna.org](http://www.iesna.org)  
Phone: (212) 248-5000  
FAX: (212) 248-5017/18

...

## **UNDERWRITERS LABORATORIES, INC. (UL)**

UL 153                                      Portable Luminaires

...

NOTE: Authority cited: Sections 25213, 25218(e), 25402(a)-(c), and 25960, Public Resources Code.

Reference: Sections 25216.5(d), 25402(a)-(c), and 25960, Public Resources Code

**Section 1606. Filing by Manufacturers; Listing of Appliances in Database.**

...

**Table V  
Data Submittal Requirements**

...

	<b><i>Appliance</i></b>	<b><i>Required Information</i></b>	<b><i>Permissible Answers</i></b>
K	State-regulated medium screw base general service Incandescent lamps	Rated lumens	
		Rated lamp wattage	
		Bulb finish	Clear, frost, soft white
		Average lamp efficacy	
		ANSI-designated bulb shape	A-15, A-19, A-21, A-23, A-25, PS-25, PS-30, BT-14, BT-15, CP-19, TB-19, CA-22
	State-regulated medium screw base general service Compact Fluorescent lamps	Rated lumens	
		Rated lamp wattage	
		Average lamp efficacy	
	State-regulated medium screw base general service Light Emitting Diode (LED) lamps, and Organic LED (OLED) lamps	Rated lumens	
		Rated lamp wattage	
		Average lamp efficacy	

...

**Table V**  
**Data Submittal Requirements**

...

	<b>Appliance</b>	<b>Required Information</b>	<b>Permissible Answers</b>
N	<u>Portable Luminaires</u>	<u>Type of Portable Luminaire</u>	<u>Floor, table, other (specify)</u>
		<u>Total Number of lamp sockets</u>	
		<u>Base type</u>	<u>Candelabra base, intermediate base, medium screw-base, pin-base; other (specify)</u>
		<u>Compliance method used</u>	<u>List all that apply:</u> <u>Dedicated fluorescent lamp socket;</u> <u><del>complying with 1605.3 (n)4A</del></u> <u>GU-24 line-voltage socket;</u> <u><del>complying with 1605.3 (n)4B</del></u> <u>LED luminaire or light engine;</u> <u><del>complying with 1605.3 (n)4C</del></u> <u>Equipped with E12, E17, or E26</u> <u>screw-based socket w/</u> <u>prepackaged lamp;</u> <u>Halogen lamp socket w/</u> <u>controls</u> <u><del>complying with 1605.3</del></u> <u><del>(n)4</del></u>
		<u><del>Do portable luminaires that have internal power supplies have zero standby power when the luminaire is turned off?</del></u> <u>(for luminaires with internal power supplies only)</u>	<u><del>Yes, No, Not applicable</del></u>
		<u><del>Are portable luminaires with GU-24 sockets rated for use with incandescent lamps of any type, including line voltage or low voltage?</del></u> <u>(for luminaires with GU-24 sockets only)</u>	<u><del>Yes, No, Not applicable</del></u>
		<u>LED Light Output (for LED luminaires only)</u>	
		<u>LED Efficacy (for LED luminaires only)</u>	
		<u>Color Correlated Temperature (for LED luminaires only)</u>	
		<u>Color Rendering Index (for LED luminaires only)</u>	
		<u>Power Factor (for LED luminaires labeled or sold for residential use only)</u>	
	<u>GU-24 Luminaires, Sockets and Adaptors</u>	<u><del>GU-24 adaptors do not adapt a GU-24 socket to any other line voltage socket.</del></u>	<u><del>Yes, no</del></u>
		<u><del>Are luminaires with GU-24 sockets rated for use with incandescent lamps of any type, including line voltage or low voltage?</del></u>	<u><del>Yes, no</del></u>

...

**Section 1606 (j) Portable Luminaire Sales Data**

Beginning January 1, 2013, portable luminaire manufacturers selling products in California shall submit to the Energy Commission annual unit sales of portable non-screw based halogen luminaires sold in California, by major product class. Data for each calendar year shall be submitted no later than May 1 of the following year.

...

NOTE: Authority cited: Sections 25213, 25218(e), 25402(a)-(c), and 25960, Public Resources Code.

Reference: Sections 25216.5(d), 25402(a)-(c), and 25960, Public Resources Code.

...